in the works of the Andalusī author al-Judhāmī (end of 12th-beginning of 13th centuries) and the Moroccan *muwaqqit* al-Jādirī (1375 - c. 1416). In Chapter 16, Nathan Sidoli and Takanori Kusuba deal with the Arabic edition and revision of Theodosius' *Spherics* carried out by Naṣīr al-Dīn al-Ṭūsī in order to produce a mathematically sound text that could be used as a self-contained argument by a student. In Chapter 17, Adi Setia develops al-Rāzī's atomic conception of time, motion, distance and change through a translational survey of his *Maṭālib ʿĀliyah*. In Chapter 18, Emilia Calvo and Roser Puig shed new light on some features of the universal plate devised by the eleventh-century Andalusī astronomer ʿAlī b. Khalaf. In Chapter 19, Edward S. Kennedy and Nazim Faris study the eclipse technique preserved in the *Zīj* of the ninth-century astronomer Yaḥyā b. Abī Manṣūr; this is the oldest paper reproduced in the volume and an excellent example of how, as early as 1970, historians of science were using computer programming techniques to establish and verify the underlying parameters and procedures of the astronomical tables. Finally, in Chapter 20 George Saliba concerns himself with the transmission of scientific ideas from the Islamic world to Renaissance Europe, and focuses on the role played by European scholars like the Orientalist Guillaume Postel (1510-1581), who appears to have studied Arabic astronomical texts in their original language; these findings thus demonstrate that the scientific works of the Islamic world could have been transmitted to Copernicus and others without the need for Latin intermediaries.

We might well think of many emblematic authors in the field of the history of Islamic science who are not represented in Iqbal's choice of articles (and also of other important studies by the selected authors), but the book does not intend to be exhaustive and, all in all, it certainly fulfils its explicit purpose of presenting "a sample of the rich harvest which has fundamentally changed our view of the enterprise of science in Islamic civilization from the way it was viewed at the beginning of the twentieth century" (p. xxi).

Josep Casulleras

TIHON, Anne, *Πτολεμαίου Πρόχειροι Κανόνες. Les Tables Faciles de Ptolémée.* Vol. 1a. *Tables A1 – A2.*

Introduction, Édition critique. Publications de l'Institut Orientaliste de Louvain 59a. Université Catholique de Louvain. Louvain-la-Neuve, 2011. 210 pp.

MERCIER, Raymond, *Πτολεμαίου Πρόχειροι Κανόνες. Ptolemy's Handy Tables.* Vol. 1b. *Tables A1 – A2. Transcription and Commentary.* Publications de l'Institut Orientaliste de Louvain 59b. Université Catholique de Louvain. Louvain-la-Neuve, 2011. 219 pp.

These two complementary volumes are the beginning of an extremely promising project: the publication of a critical edition of Ptolemy's *Handy Tables* which, until now, were only accessible in the old edition by Nicolas B. Halma (Paris, 1822-1825), which were based on some of the Parisian manuscripts accessible to the editor, and in the unpublished Ph.D. dissertation, presented at Brown University in 1960, by W.D. Stahlman, who edited Codex Vaticanus graecus 1291 and added to it several variant readings of two other manuscripts. This project is the result of the cooperation of two well-known scholars: a philologist (Anne Tihon) and a historian of astronomy (Raymond Mercier). They intend to publish an edition of the tables only – not of the canons, which were critically edited by Heiberg among Ptolemy's *Opera minora* (Leipzig, 1907) – although their English translation of the chapters corresponding to each set of tables will appear at the end of the commentary (see, for instance, here Mercier pp. 178-181).

It seems unnecessary to underline the importance of the *Handy Tables* for the history of Islamic astronomy, in spite of the fact that no Arabic translation seems to be extant. The main evidence of the presence of the tables in the Arabic-Islamic is assembled in Mercier's appendices E (pp. 186-189) and F (pp. 190-198) which deal with the Syriac and Arabic transmission: they were known in the Syriac community at least from the time of Sergius of Reshaina (fl. 500), who calls them "Book of the Canon", and they were used by Severus Sebokht (fl. 650) who also mentions the same title in his treatise on the astrolabe. As for the Arabic transmission, Ibn al-Nadīm's *Fihrist* states that "Ptolemy's *zīj*" was translated into Arabic by Ayyūb and Simʿān for Muḥammad b.

Khālid b. Yaḥyā b. Barmak (705-782) and it is well known that al-Battānī had a copy of the tables which he considered to be the work of Theon; the same can be said of al-Bīrūnī who also speaks of the *Qānūn*, "the *zīj* of Theon". To this information Mercier adds a summary of the contents of the *Handy Tables* preserved by the historian Aḥmad al-Yaʿqūbī (d. 897): he reproduces and translates (pp. 192-196) al-Yaʿqūbī's text in Houtsma's edition (1883), with quite a few misprints in the Arabic text. Finally, we have the evidence of an Arabic translation of Theon's *Small Commentary* in a Syrian palimpsest of the Vatican Library (Vaticanus syr. 623) in which a copyist wrote, in 886, a Syriac text on folios from which Palestinian-Aramaic, Greek, Arabic, Armenian and Syriac texts had been scratched out (see Tihon pp. 41-47). The Arabic inscriptions correspond to fragments of an Arabic translation of Theon's *Small Commentary*, while the Greek texts are excerpts from the *Handy Tables*. A paleographic report by Paolo La Spisa on the Arabic texts (see Tihon pp. 84-86) shows that the writing is very similar to the so-called Palestinian Kufic or Archaic *Naskhī* and that there is no difficulty in accepting that this kind of writing corresponds to a date earlier than 886. To this information I would like to add a hypothesis: the publication of vol. II-1 of Ibn Ḥayyān's *Muqtabis* (ed. M. ʿA. Makkī, Riyāḍ, 2003, pp. 278, 525-527) gives a list of the *zīj*es brought by ʿAbbās b. Nāṣiḥ (d. after 844) from Baghdad to Córdoba towards the beginning of the 9th c.: he mentions *al-Zīj*, *al-Qānūn, al-Sindhind* and *al-Arkand*. The question is: can we identify *al-Qānūn* with Ptolemy's tables? In that case, did an Arabic translation of these tables reach al-Andalus at this early stage?

Tihon's volume begins with a preface in which she explains that the critical edition of the *Handy Tables* is in a way the result of an old project undertaken at Louvain University by three generations of scholars (A. Rome, Joseph Mogenet and Anne Tihon herself) who had already published editions of Theon's *Great Commentary* (Mogenet-Tihon) and *Small commentary* (Tihon) on the tables. Interestingly, she insists on the importance of Ptolemy's remarks in the canons that the planets' positions in longitude can be calculated using graphical methods (see also Mercier p. 1). This is not the first time a

scholar has insisted on this aspect of Ptolemy's methodology, which can be considered a precedent of medieval equatoria (see Neugebauer, *HAMA* II, pp. 984, 990, 1004).

The introduction begins with a classification of the tables extant in the manuscripts (astronomical, specific tables for the latitude of Byzantium, chronological, geographical and varia) and explains the criteria used to establish which tables can be considered part of Ptolemy's original work, that is, the ones quoted explicitly in the canons. Obviously the tables for Byzantium are excluded. She also explains her translation of the title of the tables: the term *πρόχειρος* means "handy", "easy" or "ready to use" and this is why she uses *Tables Faciles* instead of *Tables Manuelles*, while she accepts the English *Handy Tables.*

In pp. 19-50 Anne Tihon describes in detail the four oldest manuscripts in uncial script, parts of which were written in the 9th –10th c., to which she adds the aforementioned Syriac palimpsest. She also analyses the extant papyri (pp. 49-50) and gives a list of the 40 later manuscripts which she classifies into families (pp. 47-49). Her edition is based on manuscript F (Laurentianus gr. 28/26) in which the tables are written in uncial script and correspond to the reign of Leon VI the Wise (886-912), although the manuscript has many later additions dating from the 14th and 15th c. The edition faithfully reproduces the numerical values of this manuscript, in Greek alpha-numerical notation, to which the variant readings of the other three old manuscripts are added. As stated in the title of the volume, the edited tables correspond to tables A1 (right ascensions and equation of time: see an analysis of the title of this table in pp. 200-204) and A2 (oblique ascensions for the seven climates to which a table of oblique ascensions for the latitude of Byzantium is added).

Other interesting sections of the volume include a brief history of the *Handy Tables* (pp. 50-53), a paleographical analysis for the forms adopted by the zero (pp. 58-59), a complete list of the tables in the whole work (pp. 61-73), and a critical survey of the previous edition by Nicolas Halma (pp. 76-83). The volume ends with a bibliography (pp. 87-93), the edition of tables A1 and A2 in manuscript F (pp. 97-134), the variant readings of the other three older manuscripts (as well as the papyrus Oxy. 4167 and the palimpsest Vat. syr. 623)

which include the recomputation of the numerical values (pp. 137-199), and indexes of surnames and manuscripts.

Mercier's volume begins with an introduction (pp. 1-5) in which he clarifies that the *Handy Tables* were designed for readers who were not particularly interested in astronomical theory but who wished to have at their disposal the instrument to compute planetary longitudes and latitudes and to solve other problems of astronomical practice, like casting a horoscope. This introduction also mentions the ancient commentaries on the *Tables,* the diffusion of this work in Latin, Syriac and Arabic communities, the modern editions and the structure of the volume.

The volume continues with a transcription of tables A1 and A2 (including the table of oblique ascensions for Byzantium) in Arabic numerals, accompanied by a recomputation when the edited values disagree with the calculated ones (pp. 9-48), followed by a commentary divided into six chapters. Chapter 1 (pp. 51-78) contains a thorough analysis of the Egyptian and Babylonian calendars and of the Era of Philip, used in the *Tables*, to which Mercier adds a discussion of other eras such as the era of Nabonassar and the Seleucid/ Alexander *Dhū l-Qarnayn* era. This chapter uses all kinds of sources available: Greek, Babylonian, Ethiopic, Syriac and Arabic.

Chapter 2 (pp. 79-119) deals with table A1 (right ascensions and equation of time). As far as right ascensions are concerned, they are calculated for each degree of the argument, with their origin in Capricorn 0º. Mercier establishes that they derive from the corresponding table of the *Almagest* II.8, calculated for an interval of 10º in the argument, with the only difference that the latter have their origin in Aries 0º. The derivation of the *Almagest* implies the need to use an interpolation procedure, which Mercier analyses; he concludes that it corresponds to a refinement of simple linear interpolation, already explained by Theon in his commentary on the *Tables,* which Mercier calls "stepwise interpolation".

The equation of time appears in column 3 of table A1 where it is expressed in minutes and seconds of time. The author's analysis of this table leads to two surprising results: on the one hand, the solar right ascensions are not calculated using the table of right ascensions in A1 but

derive directly from the right ascension table in the *Almagest* II.8 using a simple linear (not stepwise) interpolation; on the other, the longitude of the solar apogee is 66º instead of the 65;30º of the *Almagest*. Besides, the position of the mean sun was calculated using a trigonometric expression (see p. 91) and not interpolating in the table of the solar equation. Finally the values of the equation of time were calculated at 6 degree steps, followed by simple linear interpolation. Then, Mercier offers two examples of the computation of the equation of time borrowed from the *Almagest* and from Theon's *Small Commentary*; he studies the epochs of the mean solar, lunar and planetary mean motion parameters in the *Handy Tables*, comparing them to those of the *Almagest* and the *Canobic Inscription*: the discrepancies are clarified if we assume that the times of the epochs used in the *Handy Tables* are true (not mean) solar times. Mercier, finally, analyses the equation of time in al-Battānī's canons.

Chapters 3 (pp. 120 –142) and 4 (pp. 143-145) study the tables A2 which correspond to oblique ascensions for the seven climates (including oblique ascensions for Byzantium) and to the length of one seasonal hour as a function of the solar longitude. The tables of oblique ascension, calculated for each degree of the argument, derive from the corresponding tables in the *Almagest* II.8 (interval 10º), using "stepwise interpolation". There is, however, a systematic error in some entries for each climate which arises from the use of mistaken values for the oblique ascensions at 10 degree intervals. It seems that these errors do not correspond to Ptolemy's original *Handy Tables*, but to a later recension. This is confirmed by papyrus Oxyrhynchus 4167, which contains the original values with no errors. The columns of seasonal hours derive from the values of the tables of oblique ascensions in the *Almagest*, linearly interpolated, and not from the corresponding tables A2. The table of oblique ascensions from Byzantium contains a set of values which are midway between those of climates V and VI, in the original Ptolemaic version of the *Tables.*

Chapter 5 (pp. 146-151) contains examples of the use of tables A1 and A2, and chapter 6 (pp. 152-155) contains an attempt to establish a stemma of the textual tradition, based on the evidence provided by tables A1 and A2. These are followed by

several appendices (pp. 158 ff.) one of which (App. C, pp. 178-181) is a translation of the canons corresponding to tables A1 and A2. The volume ends with a bibliography, and indexes of persons, manuscripts and papyri. The whole book is an impressive and exhaustive treatment of an extremely important subject which had been neglected for many years. We can only hope that Tihon and Mercier will continue this project until it is completed.

Julio Samsó

KING, David A., *Islamic Astronomy and Geography*. Ashgate-Variorum. Farnham, Surrey, 2012. XLII + 376 pp.

According to accepted standards, I should never write a review of a book dedicated to me and to the Barcelona school. However, I feel that both David King and myself are "au-delà du bien et du mal" and I do not believe that David really needs an adequate review in order to ask for funds for another research project. Therefore I have decided to forget about standards and to write something on a book which has been a pleasure for me to read and which has drawn my attention to some papers of David that I had missed, in spite of the fact that I am fairly well acquainted with his scientific production.

This is the fifth volume of King's collected papers in the Variorum series. It begins with a Preface (pp. VII-XIII) in which the author explains and justifies his choice of the materials selected and ends with a most interesting paragraph on the decline of Islamic science after the 15th century, in which he says that "Muslim scientists after the 15th century (...) simply dealt with the same old problems of ancient and medieval astronomy and mathematics, citing the same old authorities (...). No new questions were posed since there was, in most places in the Islamic world, no access to any findings based on the telescope." This is a more elaborate version of a comment he made to me many years ago, saying that "Islamic science declined because it had already answered all the questions posed". The preface is followed by a very long and extremely useful list of King's publications (261 items) until October 2012 (pp. XV-XLII).

The volume contains twelve papers and ends with an alphabetical index. The contents